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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,874

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Thomas Blaffert

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P. O. Box 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

PATEL, NIRAV G

ART UNIT

PAPER NUMBER

2624

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/597,874	<b>Applicant(s)</b> BLAFFERT ET AL.	
	<b>Examiner</b> Nirav G. Patel	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

### ***Response to Arguments***

1. Applicant's arguments filed 3/11/2009 have been fully considered but they are not persuasive.

**Applicant's argument for Claims 1 and 9** – the Shen reference does not teach the amended limitations of the claim.

**Examiner's response** – see analysis of Claims 1 and 9.

**Applicant's argument for Claim 10** – the Sofia Totterman reference does not disclose registration of image areas “using individually assigned registration methods.”

**Examiner's response** – Applying different strategies to motion of the rigid structure and soft tissues is another way of registering image areas of the constituents due to the fact that if the objects (rigid structures and soft tissues) move, their motion needs to be estimated so that proper registration of the object can be made, which is a registration

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method, as taught by Sofia Totterman (“Once the selected points have been registered, the motion vector of every voxel is computed,” find objects and then determine their motion). Therefore, Sofia Totterman does disclose registration of image areas “using individually assigned registration methods.”

Applicants are reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of the claims. So the Examiner interpretation of Sofia Totterman's teaching meets Applicant's recited limitation within the broad meaning of the term. The Examiner is not limited to Applicants' definition which is not specifically set forth in the claims. In re Tanaka et al., 193 USPQ 139, (CCPA) 1977.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Shen et al. (U.S. Pub. No.: 2003/0146913, "Shen").

**1) Regarding Claim 1**, Shen teaches a data processing unit for registering a first image and a second image of an object, the data processing unit being set up to:

segment the images automatically into various object constituents (Paragraph 26: to get the area and boundary information, the two lungs are segmented from the image sets for each

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slice, mainly by techniques related to thresholds. Objects that are not encompassed in the threshold limits set by the GUI (Paragraph 23) can be automatically segmented to other constituents);

register only those image areas associated with preselected object constituents which are relevant to a predetermined task (Paragraph 30: A user selects a nodule seen in the first image and the system then finds the object of interest in a second image area which is the most similar to the object in the first image. The system allows for an individual to select an object constituent by using a GUI and then registers VOI's which are associated with the preselected object constituent (nodule in image A), which is relevant to the predetermined task of locating lung nodules in images).

**2) Regarding Claim 9**, Shen teaches a method for registering a first image and a second image of an object, comprising the following steps: automatic segmentation of the images into various object constituents (Paragraph 26: to get the area and boundary information, the two lungs are segmented from the image sets for each slice, mainly by techniques related to thresholds. Objects that are not encompassed in the threshold limits set by the GUI (Paragraph 23) can be automatically segmented to other constituents);

registration of the image areas associated with preselected object constituents relevant to a predetermined task (Paragraph 30: A user selects a nodule seen in the first image and the system then finds the object of interest in a second image area which is the most similar to the object in the first image. The system allows for an individual to select an object constituent by using a GUI and then registers VOI's which are associated with the preselected object

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constituent (nodule in image A), which is relevant to the predetermined task of locating lung nodules in images).

4. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Sofia Totterman et al. (U.S. Pub. No.: 2003/0072479, "Sofia Totterman").

**1) Regarding Claim 10**, Sofia Totterman discloses a method for registering a first image and a second image of an object, comprising the following steps: automatic segmentation of the images into various object constituents (Paragraph 67: The connectivity among the voxels is estimated by a comparison of the mean values and variances estimated to form regions (object constituents). Once the connectivity is estimated, it is determined which regions need to be split, and those regions are split (automatically).);

registration of the image areas of various object constituents using individually assigned registration methods (Paragraph 69: the approach of the present invention takes into account the local deformations of soft tissues by using a priori knowledge (registration method) of the material properties of the different structures found in the image segmentation. Also, different strategies (registration methods) can be applied to the motion of the rigid structures and to that of the soft tissues to register the image areas).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shen in view of Sofia Totterman.

**1) Regarding Claim 2**, Shen fails to disclose the limitations of claim 2. However, Sofia Totterman discloses a data processing unit for registering a first image and a second image of an object, in particular a data processing unit which is set up to: segment the images automatically into various object constituents (Paragraph 67: The connectivity among the voxels is estimated by a comparison of the mean values and variances estimated to form regions (object constituents). Once the connectivity is estimated, it is determined which regions need to be split, and those regions are split (automatically).);

Incorporating the teachings of Sofia Totterman to the methods of Shen allows for segmenting images automatically. Segmenting images automatically allows for the images to be grouped off so that another process or user may discard the groups which are considered irrelevant to the examination of the images or noise. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Sofia Totterman to Shen's teachings.

7. Claims 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen in view of Zhao et al. ("Directional Edge Registration for Temporal Chest Image Subtraction," "Zhao").

**1) Regarding Claim 3**, Shen fails to disclose the limitations of claim 2. However, Zhao discloses segmented object constituents are automatically classified (Part II, Section C: "Ribs

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extraction and Boundary detection,” Lines 1 - 3: a set of rule base (reasoning) algorithms to identify rib edges was developed. The lung and heart boundaries were extracted using an invert umbrella filter. Both methods are automatic to classify objects and extract them).

Incorporating the teachings of Zhao to the methods of Shen allows for automatically classifying of segmented images. Automatically classifying the segmented images provides an efficient way to take segmented images and determine if they contain wanted data or unwanted data. This would allow for a conclusion to be made of the data which has been segmented. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Zhao to Shen’s teachings.

**2) Regarding Claim 5**, Shen fails to disclose the limitations of claim 2. However, Zhao discloses a first image and/or the second image are/is (a) two- or three-dimensional computer tomogram(s), in particular an X-ray photograph or a magnetic resonance image (Abstract: Temporal chest radiographs (2D X-ray) were used in a directional filtering technique).

Incorporating the teachings of Zhao to the methods of Shen allows for acquiring images. Acquiring 2D or 3D x-rays or magnetic resonance images (MRI) is an obvious way to acquire images of a patient's internal organs which is not invasive. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Zhao to Shen’s teachings.

**3) Regarding Claim 6**, Shen fails to disclose the limitations of claim 2. However, Zhao discloses an object is the chest of a patient, the lungs being the object constituent relevant to a tumor diagnosis (Abstract: Normal chest structures (ribs, hear, and other normal lung structures)



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were reduced due to this technique, therefore the regions of the lung where tumors are present were not reduced).

Incorporating the teachings of Zhao to the methods of Shen allows for imaging the chest of a patient. Imaging the chest allows for the lungs of a patient to be imaged so that a diagnosis can be made concerning the presence of tumors. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Zhao to Shen's teachings.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shen in view of Kawata et al. ("Tracking interval changes of pulmonary nodules using a sequence of three-dimensional thoracic images," "Kawata").

**1) Regarding Claim 4,** Shen fails to disclose the limitations of claim 2. However, Kawata discloses a linear registration is performed on several resolution levels (Abstract Lines 1 – 2: a computerized approach to characterize pulmonary nodules through quantitative analysis between sequential 3-D thoracic images is developed) rigid bodies being registered on a coarse grid (Abstract Lines 2 – 3: the registration procedure of sequential 3-D pulmonary images consisted of two transformation steps: the rigid transformation step between two sequential 3-D thoracic CT image, which is on a coarse grid as the next step involves a finer grid) followed by affine registration on a finer grid (Abstract Lines 2 – 4: the registration procedure of sequential 3-D pulmonary images consisted of two transformation steps: the affine transformation step between two sequential region-of-interest (ROI) images including the pulmonary nodule, this is on a finer grid).

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Incorporating the teachings of Kawata to the methods of Shen allows for linear registration on several resolutions to be performed. Registering rigid bodies on a coarse grid allows for objects not of interest, such as ribs, arteries, veins and other irrelevant imaged bodies to be identified without the need to finely define their boundaries due to the fact that they are not of concern. Performing an affine registration on a finer grid allows for regions of interest to be registered with high level of accuracy so that a proper diagnosis can be made. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Kawata to Shen's teachings.

9. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen in view of Kuhnigk (U.S. Pub. No.: 2005/0196024).

**1) Regarding Claim 7**, Shen fails to disclose the limitations of claim 2. However, Kuhnigk discloses segmentation is performed using a watershed transformation (Paragraph 29: segmentation is performed by means of a watershed transformation).

Incorporating the teachings of Kuhnigk to the methods of Shen allows for segmenting images. Performing a segmentation using a watershed transformation allows for segmentation based on topology, so that areas of interest are segmented properly and do not lose relevant information. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Kuhnigk to Shen's teachings.

**2) Regarding Claim 8**, Shen fails to disclose the limitations of claim 2. However, Kuhnigk discloses an imaging device for producing images of an object (Paragraph 40: three

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dimensional lung image data is acquired by computer tomography, nuclear magnetic resonance tomography or by means of another image modality);

Incorporating the teachings of Kuhnigk to the methods of Shen allows for an imaging device to produce image of an object. Using an imaging device such as nuclear magnetic resonance or computer tomography allows for an image of chest region of a patient to be produced. Therefore it would have been obvious to one of ordinary skill at the time of the invention to apply the teachings of Kuhnigk to Shen's teachings.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nirav G. Patel whose telephone number is (571)270-5812. The examiner can normally be reached on Monday - Friday 8 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nirav G. Patel/  
Examiner, Art Unit 2624